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BOX PCT
Commissioner for Patents
Washington, D.C. 20231

PCT/JP00/05258
-filed August 4, 2000

Re: Application of Yasumasa HANAZAKI
COMMUNICATION SYSTEM
Assignee: MITSUBISHI DENKI KABUSHIKI KAISHA
Our Ref: Q68877

Dear Sir:

The following documents and fees are submitted herewith in connection with the above application for the purpose of entering the National stage under 35 U.S.C. § 371 and in accordance with Chapter I of the Patent Cooperation Treaty:

- ☑ an executed Declaration and Power of Attorney.
- ☑ an English translation of the International Application.
- ☑ eight (8) sheets of drawings.
- ☑ an executed Assignment and PTO 1595 form.
- ☑ Information Disclosure Statement and a PTO/SB/08 A & B (modified) (substitute for PTO Form 1449).

It is assumed that copies of the International Application, the International Search Report, the International Preliminary Examination Report, and any Articles 19 and 34 amendments as required by § 371(c) will be supplied directly by the International Bureau, but if further copies are needed, the undersigned can easily provide them upon request.

The Government filing fee is calculated as follows:

Total claims	4	-	20	=		x	$18.00	= $.00
Independent claims	1	-	3	=		x	$84.00	= $.00
Base Fee								$890.00
TOTAL FILING FEE								$890.00
Recordation of Assignment								$ 40.00
TOTAL FEE								$930.00

Checks for the statutory filing fee of $890.00 and Assignment recordation fee of $40.00 are attached. You are also directed and authorized to charge or credit any difference or overpayment to Deposit Account No. 19-4880. The Commissioner is hereby authorized to charge any fees under 37 C.F.R. §§ 1.16, 1.17 and 1.492 which may be required during the entire pendency of the application to Deposit Account No. 19-4880. A duplicate copy of this transmittal letter is attached.

Respectfully submitted,

Robert J. Seas, Jr.
Registration No. 21,092

mt

8/prts

SPECIFICATION

COMMUNICATION SYSTEM

Technical Field

This invention relates to an occupant protecting device equipped with air bags for protecting occupants, for instance, in the event of a crash of vehicles, and related to the communication system between the main ECU (Electronic Control Unit) and the satellite ECU, which are forming the control system of the device

Background Art

In the communication system applied to the occupant protecting device for vehicles, a collision is generally detected by the acceleration sensors each provided in the main ECU and the satellite ECUs, and signals are exchanged between the two to process the result of collision determination or temporary data for the crash in the main ECU.

Fig. 1 is a schematic perspective plan view showing the positional replacement between the main ECU and satellite ECUs on a vehicle. 10 is a vehicle, 11 is the front portion, 12 is the rear portion, and 13a and 13b are the side portions. A main ECU 20 is installed in the central portion of the vehicle 10, and side satellite ECUs 30a and 30b are installed on the side portions 13a and 13b, respectively. Further, at both sides of the front portion 11, there are provided front satellite ECUs 40a and 40b, respectively. The main ECU 20 has a function of detecting a collision occurred at the front side of the vehicle to unfold air bags in front of occupants, particularly

the driver and the passenger-side occupant, and a function of receiving collision information from the other satellite ECUs 30a, 30b, 40a, and 40b to unfold the air bags on the side or in front of occupants. The side satellite ECUs 30a and 30b are to detect a side-impact collision by an acceleration sensor, and has a function of determining the accuracy of the collision by its own microcomputer and sending it to the main ECU 20 through communication lines 31a and 31b. Further, the front satellite ECUs 40a and 40b are provided, because an offset collision may not be determined only by the main ECU 20, and they have a function of processing the detection status of the acceleration sensor provided in them by their own microcomputers, and sending the processed data to the main ECU 20 through communication lines 41a and 41b.

Data sent from the satellite ECUs 30a, 30b, 40a, and 40b to the main ECU 20 represent the determination result of collision and the fault diagnosis status of the acceleration sensor under normal conditions. Thus, in the conventional communication system, a trigger signal functioning as a data request command is sent from the main ECU 20 to the satellite ECUs 30a, 30b, 40a, and 40b, and the respective satellite ECUs 30a, 30b, 40a, and 40b transmit a collision determination result or a fault diagnosis result to the main ECU according to the trigger. The main ECU 20 processes and determines the transmitted result, displays a warning or unfolds an air bag.

Fig. 2 is a block diagram showing the schematic circuit configuration for implementing the conventional communication system. In this figure, the required minimum main ECU 20 and satellite ECU 30 in a pair are shown for simplicity.

In the figure, 1 is the battery of the vehicle, by which a d.c. current is supplied to the booster circuit 21 of the main ECU 20 via an ignition switch 2. 3 and 4 are squib resistances for igniting the gun powder for unfolding the air bags (not shown) for protecting the front portion and the side portion of an occupant. If a collision occurs at the front side of the vehicle, an ignition current is supplied to the squib resistance 3 from the booster circuit 21 through a mechanical acceleration switch 27, which closes when it senses an impact in the longitudinal direction of the vehicle, and a switching transistor 28 controlled by a microcomputer 23. To the other squib resistance 4, an ignition current is also supplied from the booster circuit 21 through a switching transistor 29 controlled by the microcomputer 23 upon the occurrence of a side-impact collision to the vehicle. Further, from the booster circuit 21, a d.c. voltage is supplied to fixed-voltage circuits 22 and 32 functioning as the d.c. power supplies for the microcomputers 23 and 33 and other circuits.

Now, the operation is described.

The microcomputer 23 always determines faults of a longitudinal acceleration sensor 24 in the normal condition where there is no collision, and if a fault occurs, it outputs a signal for controlling an alarm (not shown) such as a lamp. If a collision at the front side of the vehicle occurs, the microcomputer 23 determines the detection signal from the longitudinal acceleration sensor 24, which represents a collision state, and outputs a control signal to bring the switching transistor 28 into conduction. At this point, if the mechanical acceleration switch 27 is closed, an ignition current is supplied to the squib resistance 3 to unfold the air bag in front of the

occupant.

Further, the microcomputer 23 exchanges signals with a communication circuit 25. Based on a clock pulse, a trigger signal (a) of Fig. 3 of a fixed period is sent from the communication circuit 25 to the side satellite ECU 30 side through a communication interface 26. As described later, a signal (b) or (c) of Fig. 3 sent from the satellite ECU 30 in response to the trigger signal is provided to the microcomputer 23 through the communication interface 26 and the communication circuit 25.

In the satellite ECU 30, the microcomputer 33 performs the normal fault diagnosis of a lateral acceleration sensor 34 and an acceleration switch 37, and determines the detection outputs of the lateral acceleration sensor 34 and the acceleration switch 37, if a collision at its lateral side of the vehicle occurs . In the fault diagnosis, the signal (b) of Fig. 3 is sent to the main ECU 20 side via a communication circuit 35 and a communication interface 36, and if the microcomputer 23 determines that an abnormal state has occurred, the alarm is operated to alert the occupant to it. Further, in the event of a side-impact collision, determination is made in the microcomputer 33 upon receipt of the detection signals of the lateral acceleration sensor 34 and the acceleration switch 37, and the signal (c) of Fig. 3 indicating a collision is sent to the microcomputer 23 through the communication system. Upon receipt of this signal, the microcomputer 23 determines whether the collision has actually occurred, and outputs a control signal to turn on the switching transistor 29 if it determines that the collision is dangerous. Whereupon, an ignition current flows through the squib resistance 4 via the switching transistor 29 to unfold the air bag for

side protection.

The conventional communication system is described according to Fig. 3. A trigger signal (a) of repetitive pulses with a fixed period T0 is always sent from the main ECU 20 to the satellite ECU 30 side. On the other hand, a diagnosis data provided by checking the fault status of the lateral acceleration sensor 34 and the acceleration switch 37 are outputted from the microcomputer 33, and upon the reception of a predetermined number of pulses of the trigger signal (a), a response signal (b) including the diagnosis data is sent from the communication circuit 35 to the main ECU 20 side. The response signal (b) is provided to the microcomputer 23, which determines the diagnosis data, and issues a control output to drive the alarm if there is anything wrong. Further, if a lateral collision occurs with a vehicle, the response signal is as shown by (c).

Since the conventional communication system is constructed above, the main ECU requires a transmission process for always sending the trigger signal, and a data reception process for the response signal, so the processing is complicated. Furthermore, there is a problem that the satellite ECU requires a circuit for receiving the trigger, causing an obstacle to the downsizing of the device.

This invention was accomplished to solve the above described problem, and its object is to obtain a communication system in which the communication between the main ECU and the satellite ECU is carried out by the start-stop synchronization communication provided in the microcomputer.

Disclosure of The Invention

The communication system related to this invention comprises a first microcomputer having a communication function for outputting a data signal having a data time Td and a transmission period Tp, which sends various data processed by itself and carried on the data signal, and a second microcomputer for receiving and sequentially storing data signals in a memory, and reading and processing the various data by timing pulses, and it is characterized in that the data time Td and the transmission period Tp have a relation of $Td<Tp/2$.

With this, the start-stop synchronization communication function provided in the microcomputer can be directly used to construct the device in a small size without requiring the trigger signal as in the prior art, and data reception can be automatically carried out, so there is an effect that the processing can be simplified. Further, the data time Td and the transmission period Tp are provided with the relation of $Td<Tp/2$, and thus, there is an effect that reception recovery can be made faster against a noise included during transmission.

The communication system related to this invention is characterized by theoretically having a relation of $Tr=Tp$ between the transmission period Tp and the timing pulse period Tr.

This produces an effect that the data stored in the microcomputer on the receiving side can substantially be read out and processed.

The communication system related to this invention is characterized in that the relation between the transmission period Tp and the timing pulse period Tr is set in such a manner that at least a piece of data readable from

the memory is included in a period between a timing pulse and the next timing pulse.

With this, a piece of data can always be read out and processed for each timing pulse, and there is an effect that the accuracy of the reading process can be increased.

The communication system related to this invention is characterized by theoretically having a relation of Tr=2Tp between the transmission period Tp and the timing pulse period Tr.

This produces an effect that the condition setting of the microcomputer can easily be made.

Brief Description of the Drawings

Fig. 1 is a schematic perspective plan view for explaining the positional relation between the main ECU and the satellite ECU;

Fig. 2 is a block diagram showing the circuit configuration of the conventional communication system;

Fig. 3 is a signal diagram for explaining the conventional communication system;

Fig. 4 is a block diagram showing the circuit configuration to which the communication system according to the embodiment of this invention is applied;

Fig. 5 is a signal diagram for explaining the start-stop synchronization communication used in the embodiment of this invention;

Fig. 6 is a signal diagram for explaining the communication system according to the embodiment of the present invention;

Fig. 7 is a signal diagram for explaining the signal processing method of the communication system according to the embodiment of this invention; and

Fig. 8 is a signal diagram for explaining another signal processing method of the communication system according to the embodiment of this invention.

Best Mode for Carrying Out the Invention

Now, to describe this invention in more detail, the best embodiment of this invention is described according to the accompanying drawings.

(First Embodiment)

Fig. 4 is a block diagram showing the schematic circuit configuration to which the communication system according to a first embodiment of this invention is applied. This figure is different from Fig. 2 in the point that the communication circuits (25 and 35 in Fig. 2) are not respectively provided outside the microcomputers 23 and 33. Accordingly, the construction and operation are similar to the description of Fig. 2 except for the point that signals are exchanged in a different way because the communication system is different, so that duplicate description of it is omitted here.

The microcomputer generally has a data signal generation function of the start-stop synchronization communication. This data signal has a data time that repeats in a fixed cycle, as described later. In this embodiment, the start-stop synchronization communication function of the

microcomputer is used.

In Fig. 4, the microcomputer (first microcomputer) 33 outputs the fault diagnosis data on the lateral acceleration sensor 34 and the acceleration switch 37 as well as the determination data on a side-impact collision by carrying them on a data signal of the start-stop synchronization communication. The output signal is transmitted to the main ECU 20 via the communication interface 36. In the main ECU 20, the data signal is received through the communication interface 26 and provided to the microcomputer (second microcomputer) 23. In the microcomputer 23, the data contained in the received signal is sequentially read into the memory. This data is read by timing pulses for reading which have a predetermined period, and used to determine the collision diagnosis and collision status.

In Fig. 5, an example of the data frame of the data signal used in the start-stop synchronization communication is shown. Regarding the number of bits assigned, the start bit is assigned one bit, the data bits are assigned eight bits of b0 to b7, the parity is assigned one bit, and the stop bit is assigned one bit, which are constructed in this order. The fault diagnosis data, collision data, and other necessary data are represented by the data bits b0 to b7 of the signal. However, the number of data bits is not limited to eight, and it is determined by the microcomputer used.

Fig. 6 shows the relation between the data transmission period Tp and the data time (time of data frame) Td of the signal used in the start-stop synchronization communication.

For the case of Td>Tp/2, the transmission data signal from the microcomputer 3 3 has a time allocation as shown in (a). A noise may be

included in a non-data time band as shown in (b). If this occurred, the microcomputer 23 of the main ECU 20 would erroneously detect the noise as the start bit, and start to read data. Assuming that the data read time is the same as the original data time Td, if a data change from 1 to 0 occurred after the end of the reading, the microcomputer 23 would again erroneously detect it as the start bit to start the read operation. If this error operation is repeated, it takes time for the normal receive state to be recovered, and the recovery can be impossible under certain circumstances.

Thus, in the first embodiment, the data transmission period Tp and the data time Td are set so as to have a relation of Td<Tp/2 shown in Fig. 6 (c). By this, even if reading due to a wrong detection by the microcomputer 23 occurs when a noise is included, as shown in (d), the normal receive state can be recovered at least on around the third time.

When a data signal having the transmission period Tp as described above is received at the microcomputer 23, it is stored in the built-in memory of a predetermined capacity while being sequentially renewed. Each of the data accumulated in the memory is read out in response to timing pulses for reading which repeat with a predetermined period Tr, and subject to data processing. The relation between the timing pulse period Tr and the transmission period Tp is described according to the signal diagrams shown in Figs. 7 and 8.

Assuming that the timing pulse period Tr is fixed, the transmission period Tp is set by the microcomputer 33. Both periods Tr and Tp are preferably set to the same value, but actually it is almost impossible to make them the same because of variations in the frequency of the oscillator

to be used. Accordingly, the two periods Tr and Tp are somewhat different from each other, and have a relation of Tp>Tr as shown in f 7 (a) or Tp<Tr as shown in Fig. 7 (b).

For the case of Tp>Tr, the timing pulses p1 and p2 for reading can read respective data d1 and d2, but the timing pulse p3 cannot read data d3, because it has not completely been stored in the memory. Instead, it is the timing pulse p4 that reads the data d3, and the processing delays accordingly.

Further, for the case of Tp<Tr, the timing pulse p1 cannot read the data d1, which is read by the pulse p2. The data d2 is not used, because the pulse p2 has read the data d1 once. The next timing pulses p3 and p4 will read the data d3 and d4 in sequence. Thus, time t1 is generated where reading and data processing are not performed.

As described above, by theoretically setting the timing pulse period Tr and the transmission period Tp to the same value, though they actually differ from each other, the determination function of the microcomputer 23 can effectively be achieved. However, to further increase the accuracy of it, and to take into consideration the construction of a simple circuit, the data transmission period Tp is preferably theoretically set 1/2 times the timing pulse period Tr. In this case, the relation between the two also actually fluctuates a little, and it becomes 2Tp>Tr as shown in Fig. 8 (a) or 2Tp<Tr as shown in Fig. 8 (b).

For the case of 2Tp>Tr, the timing pulses p1, p2, p3, and p4 read and process the data d1, d3, d4, and d6 existing between the respective pulses. The timing pulse can read out and process any data without fail.

Further, for the case of 2Tp<Tr, the timing pulses p1, p2, p3, and p4 also read and process the data d1, d3, d6, and d8 existing between the respective pulses without fail. The latest data is read and processed. Further, even if a time t2 occurs in which no data is read and processed, it is shorter than the time t1 in Fig. 7 (b).

As described above, in accordance with the first embodiment, since fault diagnosis and collision data are directly transmitted to the microcomputer 23 of the main ECU 20 by using the data signal for start-stop synchronization communication provided in the microcomputer 33 of the satellite ECU 30, and processed by using the processing function of the start-stop synchronization communication, no trigger signal is required, so the device can be made small-sized without providing any specific transmitter-receiver circuit, and the processing becomes simple because data reception is automatically carried out.

Further, in accordance with the first embodiment, the data time Td and the transmission period Tp of the data signal are set in such a relation of Td<Tp/2, and thus, the time taken for the detection operation to recover the normal reception on the receiving side can be shortened even if a noise is included.

Further, in accordance with the first embodiment, by setting the condition between the transmission period Tp of the data signal and the read timing pulse period Tp of the microcomputer 23 of the main ECU 20, the processing accuracy can be increased. In particular, if the relation between the transmission period Tp and the timing pulse period Tr is established such that at least one piece of data readable from the memory is

included between a timing pulse and the next timing pulse, the processing is made effective. Specifically, to enable easy setting on the condition setting of the microcomputer and reduce as much as possible the data that is not read, the relation of 2Tp=Tr is preferable.

(Industrial Applicability)

As described above, the communication system related to this invention enables the actual circuit assembly to be made simple by using the communication function normally provided to the microcomputer, namely the start-stop synchronization communication function, and thus, it contributes to downsizing the circuit and maintenance can easily be carried out. Accordingly, it is desired that the system is put in a practical use with the vehicular occupant protecting device, which has increasingly been permanently provided in recent years.

CLAIMS

1. A communication system comprising: a first microcomputer having a communication function for outputting a data signal having a data time Td and a transmission period Tp, and sending various data that are processed by itself and carried on said data signal; and a second microcomputer for receiving and sequentially storing said data signal in a memory, and reading and processing said various data by timing pulses, wherein said data time Td and said transmission period Tp have a relation of $Td<Tp/2$.

2. The communication system according to claim 1, wherein a relation of $Tr=Tp$ is theoretically provided between the transmission period Tp and the timing pulse period Tr.

3. The communication system according to claim 1, wherein the relation between the transmission period Tp and the timing pulse period Tr is set in such a manner that at least a piece of data readable from the memory is included in a period between a timing pulse and the next timing pulse.

4. The communication system according to claim 1, wherein a relation of $Tr=2Tp$ is theoretically provided between the transmission period Tp and the timing pulse period Tr.

ABSTRACT

In a first microcomputer, a communication function is provided for outputting a data signal having a transmission period Tr that has a relation of Td<Tp/2 with a data time Td, and it sends various data processed by itself and carried on the data signal to a second microcomputer, where the received data signal is sequentially stored in a memory, and the various data are read by timing pulses for reading and processed.

FIG.1

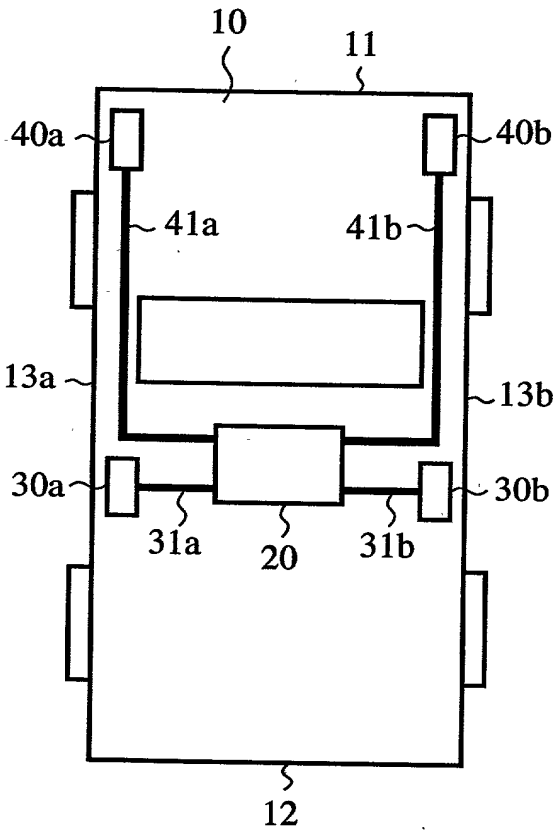


FIG.2

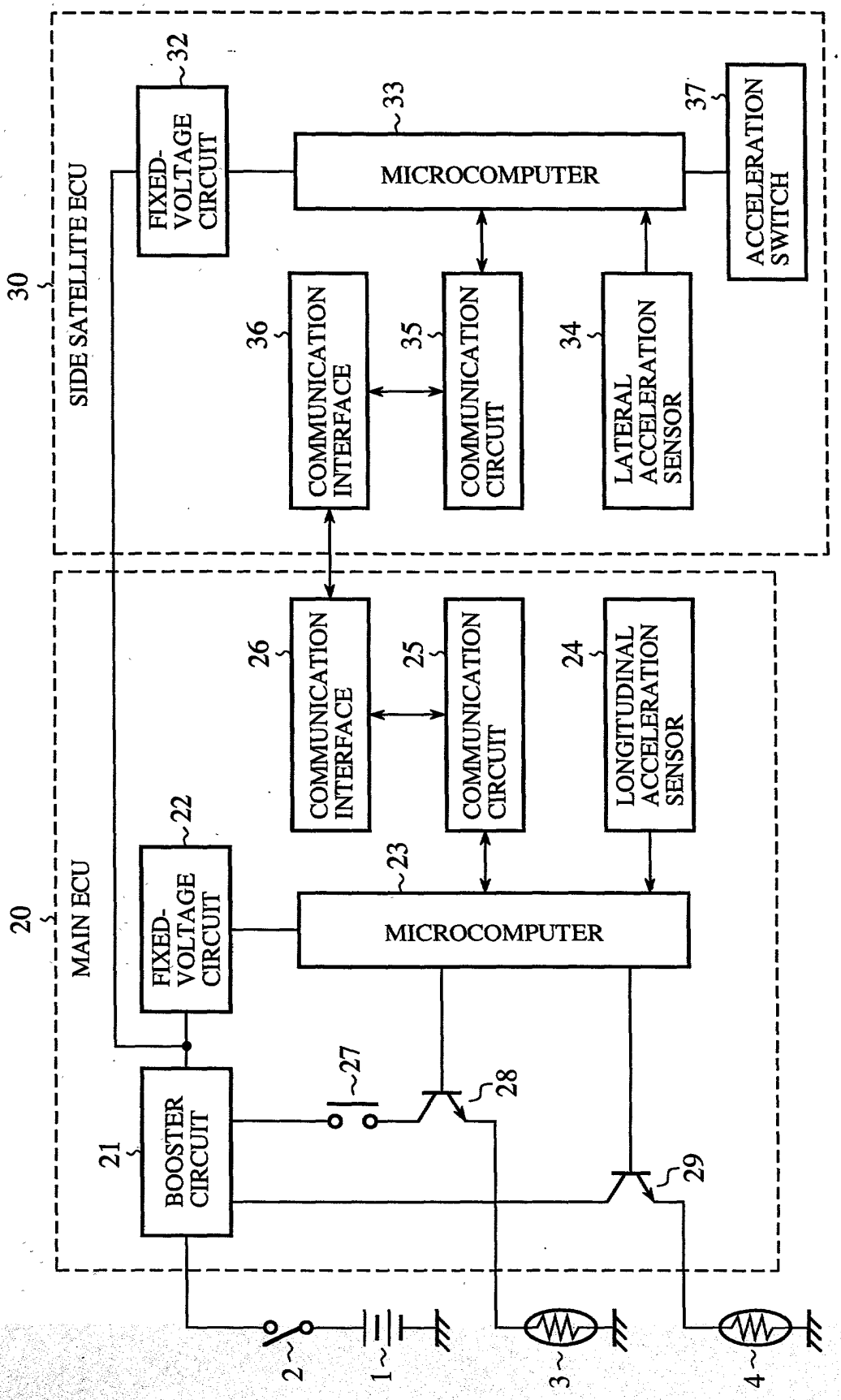

SIDE SATELLITE ECU
30
FIXED-VOLTAGE CIRCUIT
32
MICROCOMPUTER
33
ACCELERATION SWITCH
37
COMMUNICATION INTERFACE
36
COMMUNICATION CIRCUIT
35
LATERAL ACCELERATION SENSOR
34
MAIN ECU
20
COMMUNICATION INTERFACE
26
COMMUNICATION CIRCUIT
25
LONGITUDINAL ACCELERATION SENSOR
24
FIXED-VOLTAGE CIRCUIT
22
MICROCOMPUTER
23
BOOSTER CIRCUIT
21
27
28
29
2
1
3
4

FIG.3

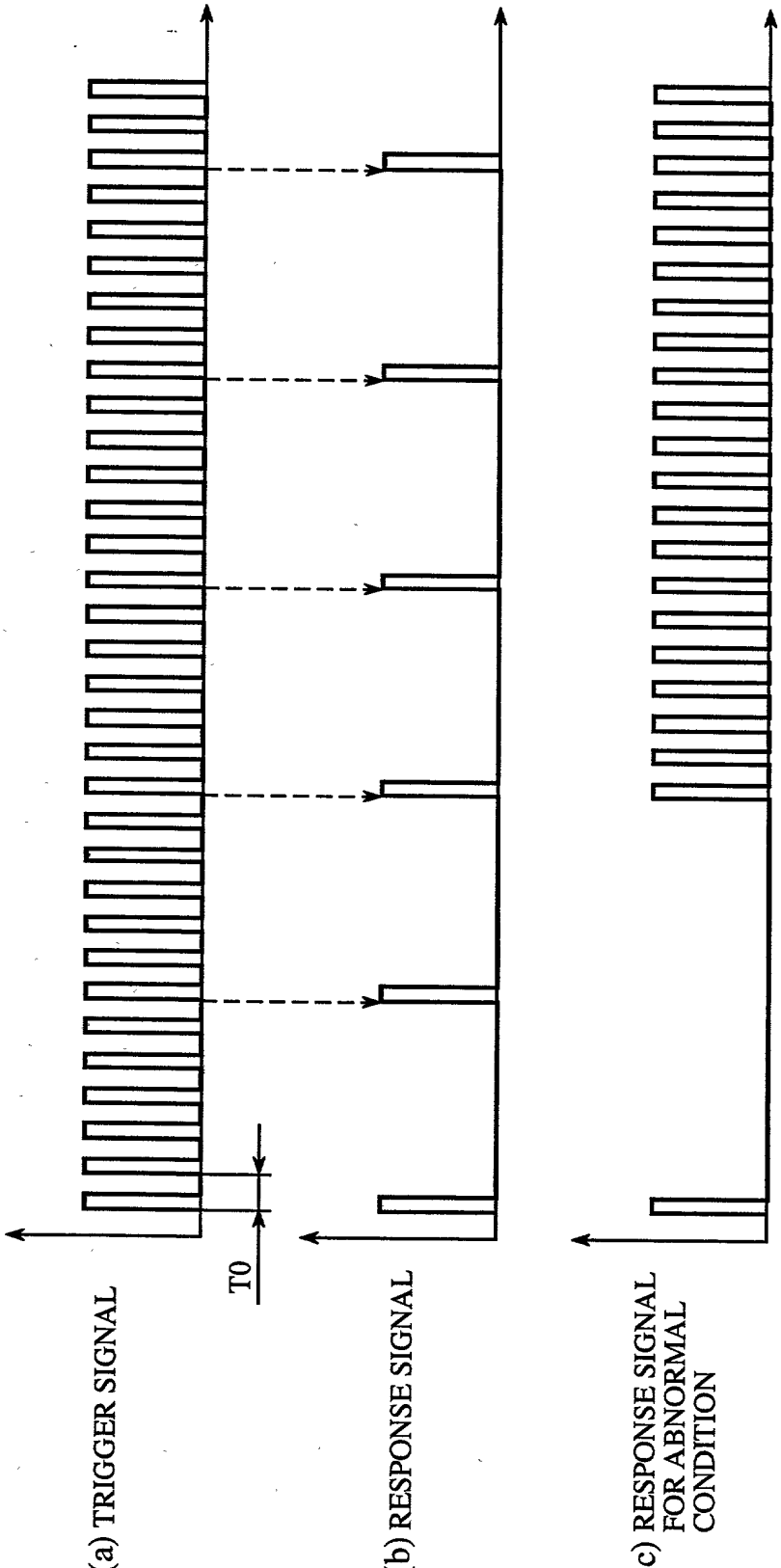

(a) TRIGGER SIGNAL
T0
(b) RESPONSE SIGNAL
(c) RESPONSE SIGNAL FOR ABNORMAL CONDITION

FIG.4

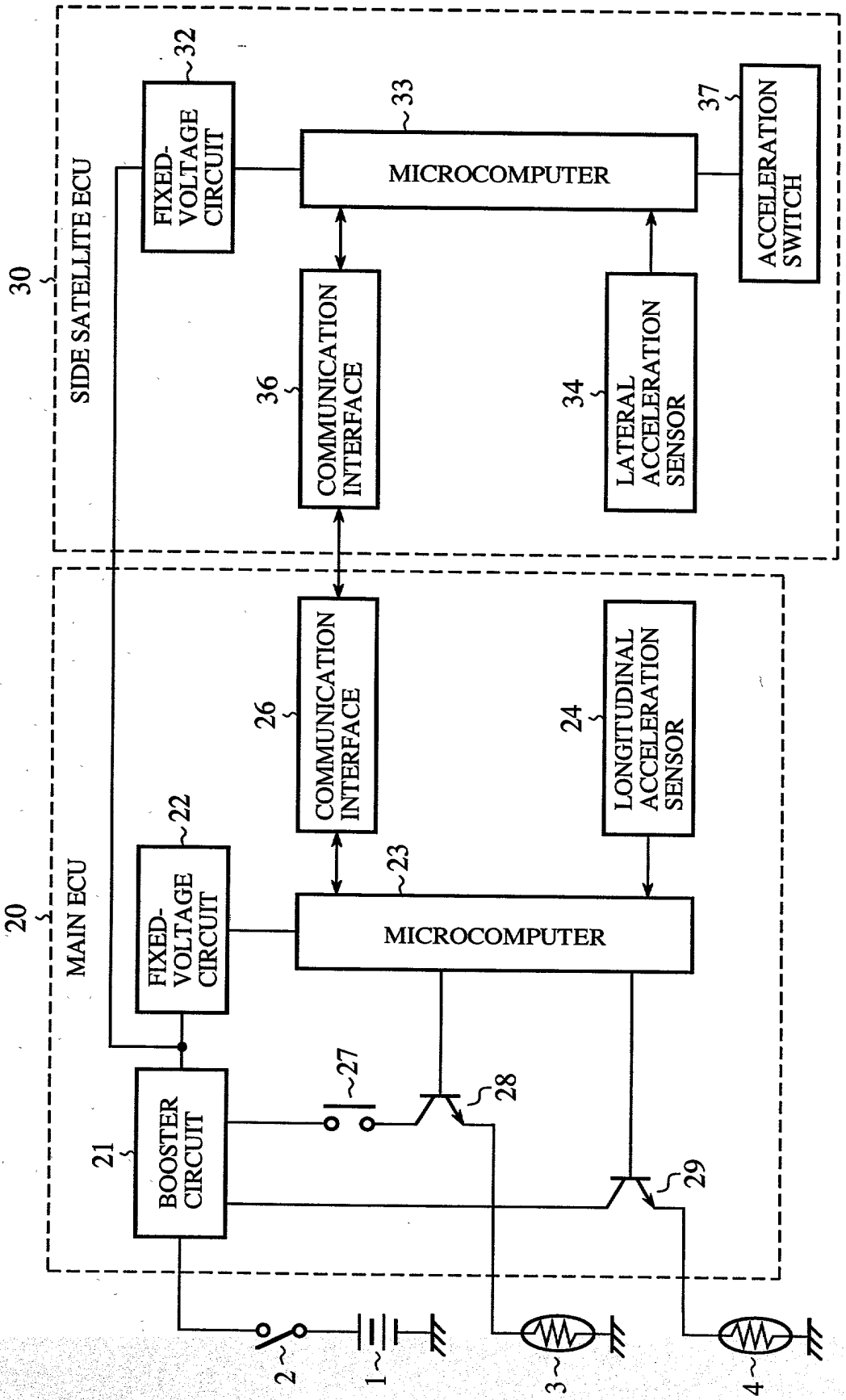

SIDE SATELLITE ECU
30
FIXED-VOLTAGE CIRCUIT
32
MICROCOMPUTER
33
ACCELERATION SWITCH
37
COMMUNICATION INTERFACE
36
LATERAL ACCELERATION SENSOR
34
MAIN ECU
20
COMMUNICATION INTERFACE
26
LONGITUDINAL ACCELERATION SENSOR
24
FIXED-VOLTAGE CIRCUIT
22
MICROCOMPUTER
23
BOOSTER CIRCUIT
21
27
28
29
1
2
3
4

FIG.5

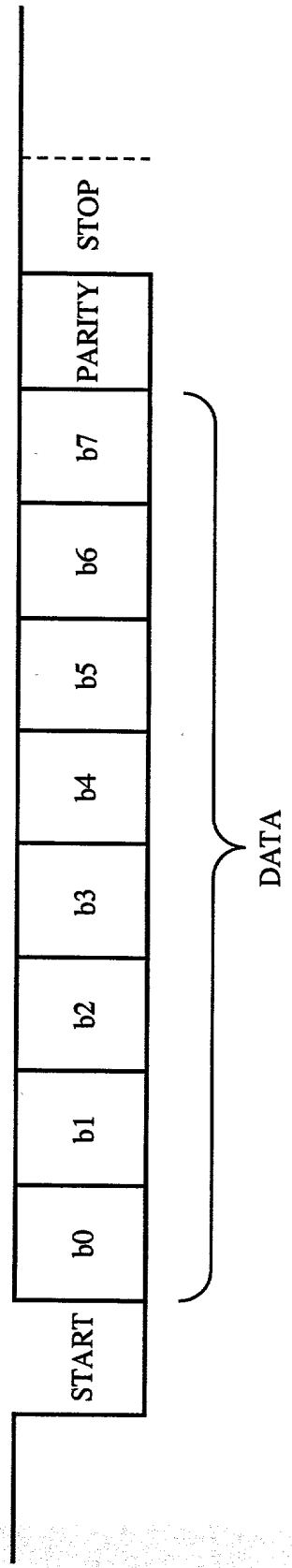


FIG.6

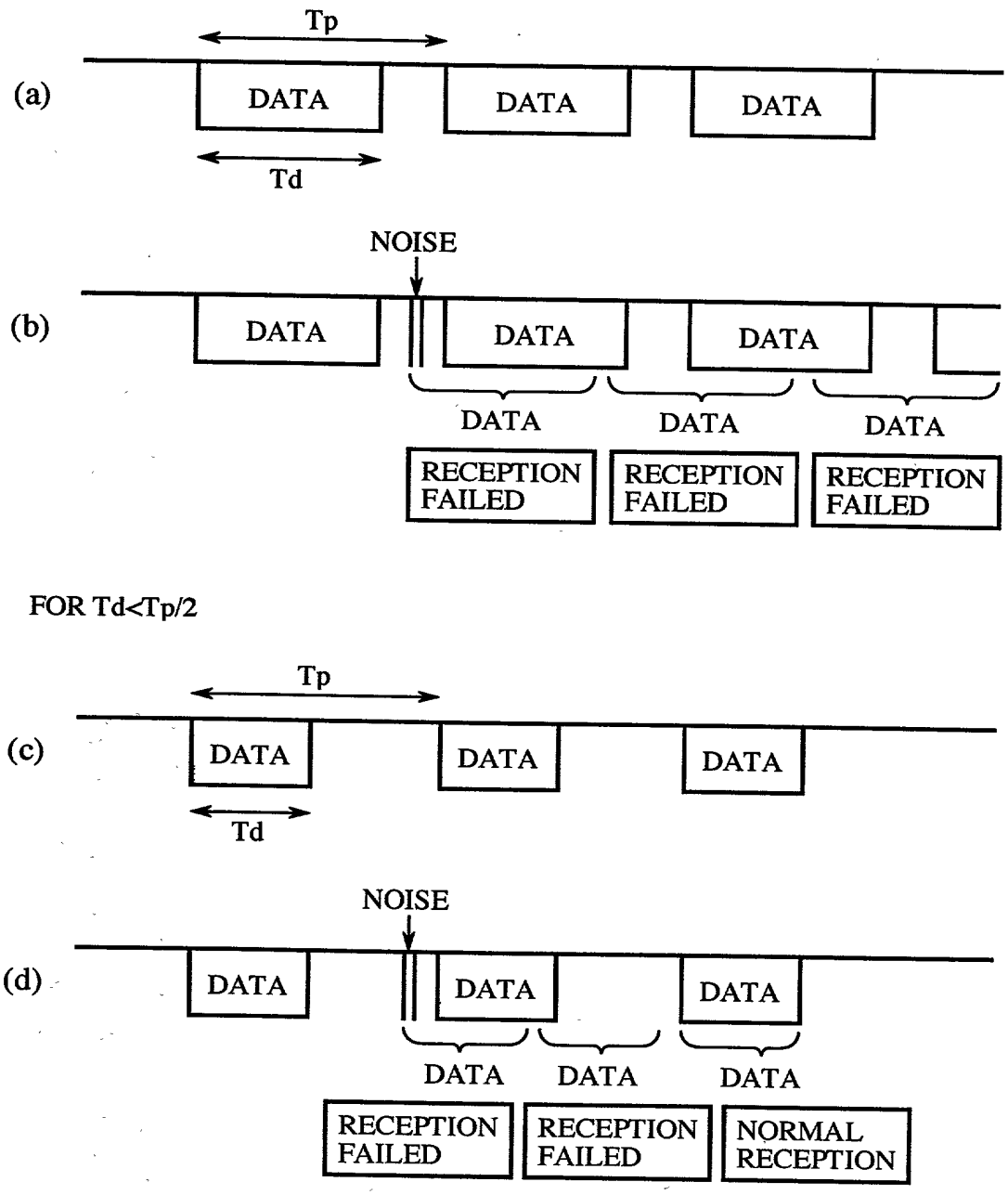

FOR Td>Tp/2
Tp
(a)
DATA
DATA
DATA
Td
NOISE
(b)
DATA
DATA
DATA
DATA
DATA
DATA
RECEPTION FAILED
RECEPTION FAILED
RECEPTION FAILED
FOR Td<Tp/2
Tp
(c)
DATA
DATA
DATA
Td
NOISE
(d)
DATA
DATA
DATA
DATA
DATA
DATA
RECEPTION FAILED
RECEPTION FAILED
NORMAL RECEPTION

FIG.7

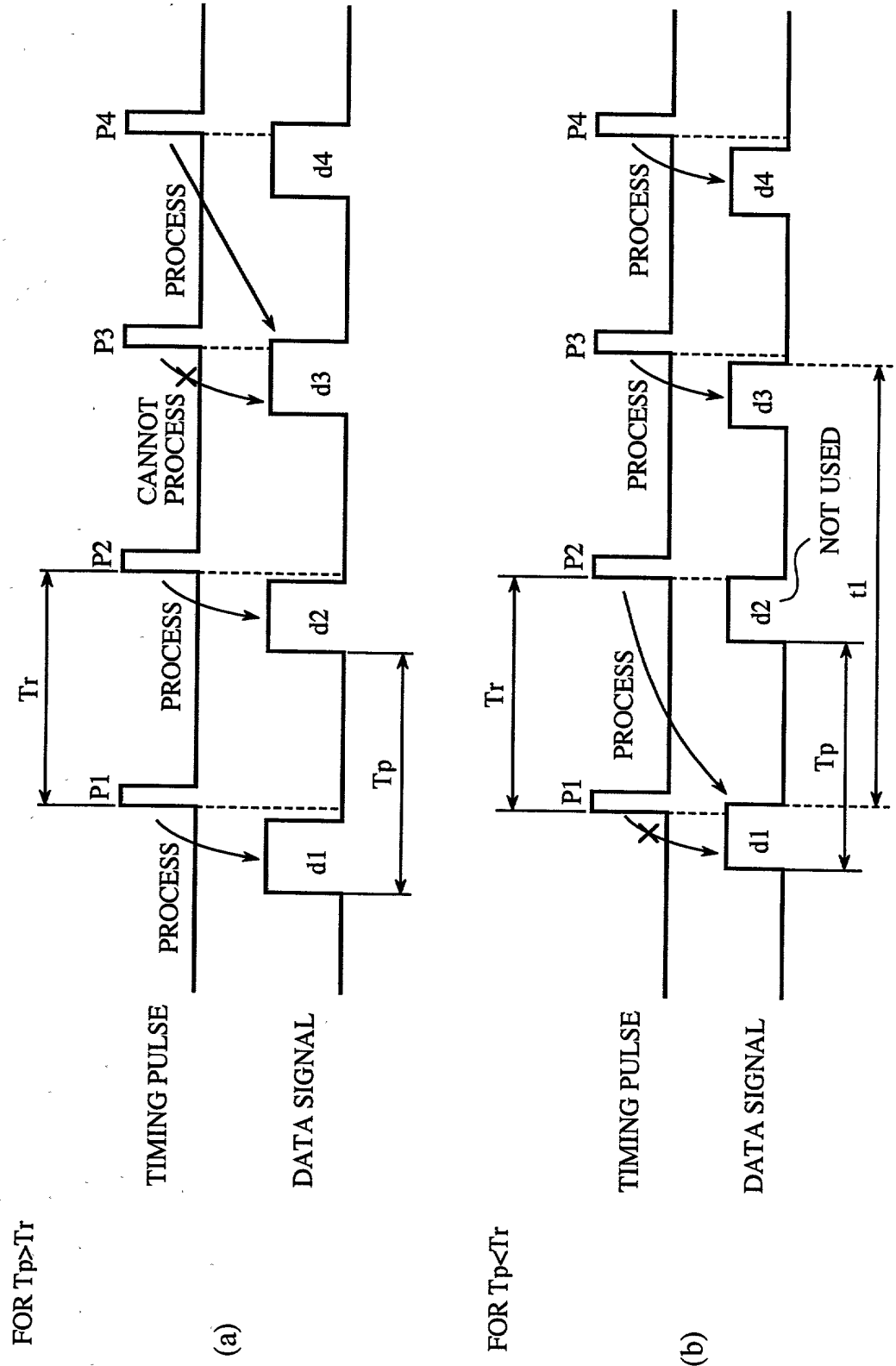
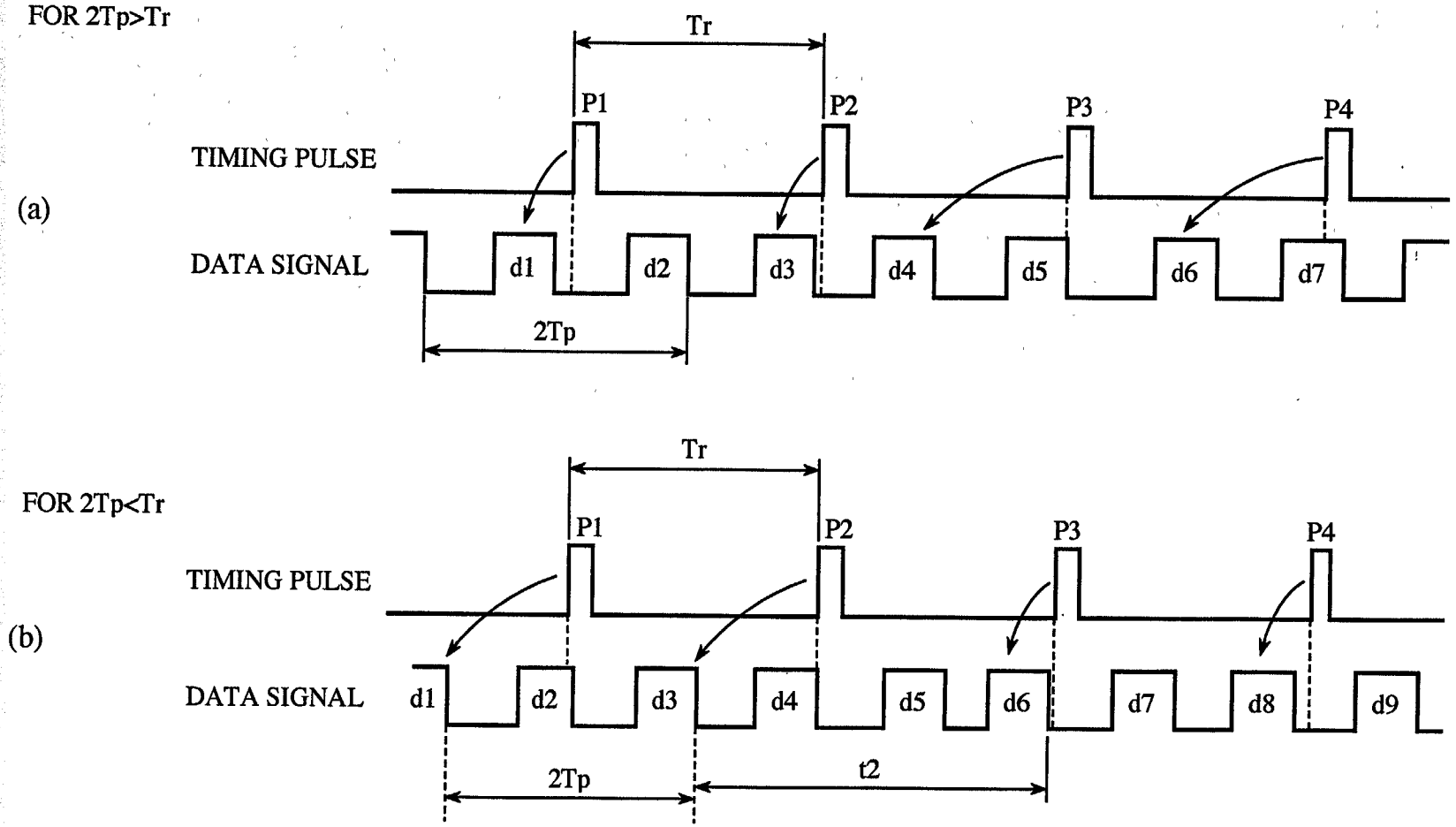


FIG.8



Declaration and Power of Attorney for Patent Application

特許出願宣言書

Japanese Language Declaration

私は、下欄に氏名を記載した発明として、以下の通り宣言する：

As a below named inventor, I hereby declare that:

私の住所、郵便の宛先および国籍は、下欄に氏名に続いて記載したとおりであり、

My residence, post office address and citizenship are as stated below next to my name,

名称の発明に関し、請求の範囲に記載した特許を求める主題の本来の、最初にして唯一の発明者である（一人の氏名のみが下欄に記載されている場合）か、もしくは本来の、最初にして共同の発明者である（複数の氏名が下欄に記載されている場合）と信じ、

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

"COMMUNICATION SYSTEM"

その明細書を
（該当するほうに印を付す）

the specification of which
(check one)

☐ ここに添付する。

☐ is attached hereto.

☐ _____ 日に出願番号

第 _____ 号として提出し、

☒ was filed on August 4, 2000 as

International Application Serial No. PCT/JP00/05258

_____ 日に補正した。
（該当する場合）

and was amended on _____
(if applicable)

私は、前記のとおり補正した請求の範囲を含む前記明細書の内容を検討し、理解したことを陳述する。

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

私は、連邦規則法典第37部第1章第56条(a)項に従い、本願の審査に所要の情報を開示すべき義務を有することを認める。

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

Japanese Language Declaration

私は、合衆国法典第35部第119条、第172条、又は第365条に基づく下記の外国特許出願又は発明者証出願の外国優先権利益を主張し、さらに優先権の主張に係わる基礎出願の出願日前の出願日を有する外国特許出願又は発明者証出願を以下に明記する：

I hereby claim foreign priority benefits under Title 35, United States Code §119, §172 or §365 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior foreign applications
先の外国出願

			Priority claimed 優先権の主張	
(Number) (番　号)	(Country) (国　名)	(Day/Month/Year Filed) (出願の年月日)	☐ Yes あり	☐ No なし
(Number) (番　号)	(Country) (国　名)	(Day/Month/Year Filed) (出願の年月日)	☐ Yes あり	☐ No なし
(Number) (番　号)	(Country) (国　名)	(Day/Month/Year Filed) (出願の年月日)	☐ Yes あり	☐ No なし
(Number) (番　号)	(Country) (国　名)	(Day/Month/Year Filed) (出願の年月日)	☐ Yes あり	☐ No なし
(Number) (番　号)	(Country) (国　名)	(Day/Month/Year Filed) (出願の年月日)	☐ Yes あり	☐ No なし

私は、合衆国法典第35部第120条に基づく下記の合衆国特許出願の利益を主張し、本願の請求の範囲各項に記載の主題が合衆国法典第35部第112条第1項に規定の態様で先の合衆国出願に開示されていない限度において、先の出願の出願日と本願の国内出願日又はＰＣＴ国際出願日の間に公表された連邦規則法典第37部第1章第56条(a)項に記載の所要の情報を開示すべき義務を有することを認める。

I hereby claim the benefit of Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose any material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT international filing date of this application:

(Application Serial No.) (出願番号)	(Filing Date) (出願日)	(現　況) (Status) 特許済み、係属中、放棄済み) (patented, pending abandoned)
(Application Serial No.) (出願番号)	(Filing Date) (出願日)	(現　況) (Status) 特許済み、係属中、放棄済み) (patented, pending abandoned)

私は、ここに自己の知識に基づいて行った陳述がすべて真実であり、自己の有する情報及び信ずるところに従って行った陳述が真実であると信じ、更に故意に虚偽の陳述等を行った場合、合衆国法典第18部第1001条により、罰金もしくは禁固に処せられるか、又はこれらの刑が併科され、又はかかる故意による虚偽の陳述が本願ないし本願に対して付与される特許の有効性を損なうことがあることを認識して、以上の陳述を行ったことを宣言する。

I hereby declare that all statements made herein of my own knowledge are true; and further that all statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Japanese Language Declaration

委任状： 私は、下記発明者として、以下の代理人をここに選任し、本願の手続きを遂行すること並びにこれに関する一切の行為を特許商標局に対して行うことを委任する。
（代理人氏名及び登録番号を明記のこと）

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith *(list name and registration number)*

I hereby appoint John H. Mion, Reg. No. 18,879; Donald E. Zinn, Reg. No. 19,046; Thomas J. Macpeak, Reg. No. 19,292; Robert J. Seas, Jr., Reg. No. 21,092; Darryl Mexic, Reg. No. 23,063; Robert V. Sloan, Reg. No. 22,775; Peter D. Olexy, Reg. No. 24,513; J. Frank Osha, Reg. No. 24,625; Waddell A. Biggart, Reg. No. 24,861; Robert G. McMorrow, Reg. No. 19,093; Louis Gubinsky, Reg. No. 24,835; Neil B. Siegel, Reg. No. 25,200; David J. Cushing, Reg. No. 28,703; John R. Inge, Reg. No. 26,916; Joseph J. Ruch, Jr., Reg. No. 26,577; Sheldon I. Landsman, Reg. No. 25,430; Richard C. Turner, Reg. No. 29,710; Howard L. Bernstein, Reg. No. 25,665; Alan J. Kasper, Reg. No. 25,426; Kenneth J. Burchfiel, Reg. No. 31,333; Gordon Kit, Reg. No. 30,764; Susan J. Mack, Reg. No. 30,951; Frank L. Bernstein, Reg. No. 31,484; Mark Boland, Reg. No. 32,197; William H. Mandir, Reg. No. 32,156; Scott M. Daniels, Reg. No. 32,562; Brian W. Hannon, Reg. No. 32,778; Abraham J. Rosner, Reg. No. 33,276; Bruce E. Kramer, Reg. No. 33,725; Paul F. Neils, Reg. No. 33,102; and Brett S. Sylvester, Reg. No. 32,765, my attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith, and request that all correspondence about the application be addressed to SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC, 2100 Pennsylvania Avenue, N.W., Washington, D.C. 20037-3202.

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（第三又はそれ以降の共同発明者に対しても同様な情報および署名を提供すること。）

(Supply similar information and signature for third and subsequent joint inventors.)